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(54) **Fabric treatment composition**

(57) A fabric treatment composition for domestic use comprises at least one domestic fabric softening agent which is capable of softening a plurality of different fabrics or textiles when the fabrics or textiles are treated with the composition, together with a removable wax.

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FABRIC TREATMENT COMPOSITION

THIS INVENTION relates to a fabric treatment composition.

According to a first aspect of the invention, there is provided a fabric treatment composition, which comprises

at least one domestic fabric softening agent capable of softening a plurality of different fabrics or textiles on treatment of the fabrics or textiles with the composition; and

a removable wax in admixture with the domestic softening agent.

By 'domestic fabric softening agent' is thus meant a softening agent which can impart to a variety of different fabrics and/or domestic textiles and/or industrial textiles, or modify, eg enhance, in respect of such fabrics or textiles, one or more softening effect or property such as softness, smooth hand, fabric conditioning, water absorption, non-scratchiness, fluffiness, and/or reduction in static, on treatment of such fabrics and/or textiles with the composition. It is thus not fabric or textile specific. Furthermore, such agent is suitable

for use in a domestic washing machine, eg by adding it to the rinse water during a rinse cycle of such a domestic washing machine, or in a hand washing operation.

By 'removable wax' is meant a wax which, on treatment of a fabric, domestic textile and/or industrial textile with the composition, is adsorbed onto the fabric or textile fibres, and, when the fabric or textile is subjected to a subsequent wash cycle, is substantially removed from the fibres, so that a build-up or accumulation of wax layers on the fibres is thereby avoided. The wax may be a wax produced by the Fischer-Tropsch process, hereinafter referred to as a 'FT wax', polyethylene wax, or any other suitable natural or synthetic wax, or a chemical modification thereof.

The wax may, in particular, be a chemically modified, eg oxidized and/or saponified, wax. The wax preferably has an acid value of 3 to 60, and a saponification number of 15 to 120. Preferably, FT wax is used. The FT wax may have a relative density, at room temperature, between 0,9 and 1,0. The wax may be that obtainable from Sasol Chemical Industries (Pty) Limited, PO Box 1, Sasolburg, South Africa under the trademark SASOLWAKS. For example, it may be their SASOLWAKS A15.

The wax may form part of an emulsion and/or dispersion (hereinafter referred to as an 'emulsion/dispersion' for brevity) containing also a carrier liquid and at least one surfactant, admix d with the domestic fabric softening agent. The carrier

liquid may be water, while the surfactant may be selected to render the emulsion/dispersion cationic, non-ionic, amphoteric or anionic. Typically, the emulsion/dispersion may comprise, on a mass basis, from 5% to 50% wax; and from 1% to 10% surfactant; with the balance being water.

The emulsion/dispersion may also include an acid or an alkali for surfactant and pH control.

Typically, the emulsion/dispersion may comprise

wax	-	about 20 parts by mass
surfactant	-	about 5 parts by mass
acid/alkali	-	about 0,5 parts by mass
water	-	about 74 parts by mass

The emulsion/dispersion may be prepared by a method which comprises melting the wax; mixing the surfactant with the molten wax; mixing the acid or alkali with the wax/surfactant blend; mixing the resultant wax blend with the water which is at elevated temperature, and cooling the resultant emulsion/dispersion to room temperature, before admixing it with the domestic softening agent.

More particularly, the temperature of the water may be close to its boiling point, and the wax blend may be added slowly to the water with rapid stirring of the water. The stirring may be effected at about 400 rpm, increasing gradually to about 1000 rpm. The emulsion/dispersion may be stirred, for example,

at about 400 rpm, while it cools to room temperature. The rate of cooling may be controlled at between 1°C per minute and 20°C per minute, depending on the stirring speed, so that a stable emulsion/dispersion is obtained, and is typically about 2°C per minute.

The fabric treatment composition may naturally also include other components conventionally present in domestic fabric softeners, such as one or more of an optical brightener, a dye or colourant, a fragrance or perfume, a lower aliphatic alcohol, a thickening agent, a buffer, an anti-static agent or a non-degradable long chain organic compound. In particular, one or more of such other components or adjuncts may be present or admixed with the domestic fabric softening agent as a domestic softener composition with which the emulsion/dispersion is then mixed, in a method of preparing the fabric treatment composition.

The method may include adding the emulsion/dispersion to the domestic softener composition with stirring, and, if desired or necessary, diluting the mixture with a carrier liquid which is compatible with the domestic fabric softener composition. For example, dilution may be desired to maintain the solids content of the composition at approximately that of the domestic softener composition. Thus, when the domestic fabric softener composition is aqueous based and dilution is desired or necessary, the carrier liquid will normally be water.

The emulsion/dispersion must thus be compatible with, eg not separate out from, the domestic softener composition. Thus, the ionic nature of the emulsion/dispersion will usually be matched to that of the domestic softener composition. The emulsion/dispersion may be cationic, non-ionic, amphoteric or anionic, depending on the domestic softener composition, and its ionic nature may be controlled by virtue of the surfactant used.

The domestic fabric softening agent may be, or may include, one or more of the following: a quaternary ammonium compound such as a di-(higher alkyl)-di-(lower alkyl) ammonium salt, an amide imidazolinium alkyl sulphate, or any other known domestic fabric softening agent.

The fabric treatment composition of the invention may comprise, by mass, from 5% to 50% emulsion/dispersion; and from 95% to 50% domestic softener composition.

More particularly, the water treatment composition may comprise, by mass

emulsion/dispersion	-	about 20 parts
domestic softener composition	-	about 80 parts

The fabric treatment composition according to the invention may be used in a method of treating fabrics, domestic textiles and/or industrial textiles by adding it to a laundering cycle of such fabrics or textiles. In particular, it may be added to the rinse water with which such fabrics or textiles are rinsed after

washing thereof with soap or detergent. Thus, the composition may be added to rinse water during the rinse cycle of an automatic washing machine in which such textiles or fabrics are washed. More preferably, the method may include washing such fabrics or textiles repeatedly, eg after use, and applying the composition after one or more of the wash cycles, during rinsing of the fabrics or textiles. Due to the removable or non-permanent nature of the wax thus deposited on the fabric or textile fibres, the layer of wax and domestic fabric softening agent deposited during a particular rinse cycle is removed during the next wash cycle, due to saponification or the like of the wax. In this fashion, build-up on the fibres, and accompanying disadvantages such as discolouration, are avoided or minimized by using a fabric treatment composition according to the invention.

The invention extends also to an emulsion/dispersion, to a method of preparing an emulsion/dispersion, to a method of preparing a fabric treatment composition, and to a method of treating a fabric, domestic textile and/or an industrial textile, as hereinbefore described.

The invention extends also to an emulsion/dispersion, and to a fabric treatment composition, when prepared according to the methods hereinbefore described.

The invention will now be described by way of the following non-limiting example.

EXAMPLE

An oxidized hard Fischer-Tropsch derived wax, obtainable from Sasol Chemical Industries (Pty) Limited, PO Box 1, Sasolburg, Republic of South Africa, under the trademark SASOLWAKS A15, was used in this example.

Some typical properties of SASOLWAKS A15 are given in Table 1.

TABLE 1

	<u>PROPERTIES</u>	<u>UNITS</u>	<u>TYPICAL VALUES</u>
10	Congealing point	°C	90
	Drop melting point	°C	103
	Softening point (R&B)	°C	95
	Acid value	mg KOH/g	16
	Ester value	mg KOH/g	13
15	Saponification value	mg KOH/g	29
	Penetration at 25°C	0,1 mm	4
	Density at 25°C	g/cm ³	0,94
	Average molecular mass		707

20 parts by mass of SASOLWAKS A15 was melted to a temperature between 135°C and 140°C, while 74 parts by mass of water was heated up separately to 90°C to 95°C. 5 parts by mass GENAMIN O - 050 surfactant, having a hydrophilic-lipophilic balance ('HLB') of 9 and oleylamine (1-octadecen-9-ylamin) as active ingredient, and obtainable from Hoechst South Africa (Pty) Limited, of 90 Pendlebury Road, Mobeni 4060, was slowly added to the molten wax, with intimate mixing. Thereafter, 0,5 parts by mass acetic acid for surfactant and pH control was slowly added to the wax/surfactant blend, with intimate mixing.

The wax/surfactant/acetic acid blend was then slowly added to the water with initial stirring thereof, using a propeller type laboratory stirrer, at about 400 rpm, increasing to rapid stirring at about 1000 rpm. The resultant cationic emulsion/dispersion was continuously stirred at a rate of about 400 rpm, while it was cooled under controlled conditions, at a rate of about 2°C per minute, to room temperature.

The properties of the emulsion/dispersion are given in Table 2.

TABLE 2

10	Solids	about 25%
	Viscosity at 30°C	about 50 cP
	Density @ 25°C	about 0,99 kg/ℓ
	pH	about 5
	Stability at 60°C (10 days)	stable
15	Stability on 50°C/5°C cycling (2 cycles)	stable

A fabric treatment composition according to the invention was made up by adding 20 parts by mass of the emulsion/dispersion to 80 parts by mass of an aqueous-based domestic softener composition available under the trademark SUNLIGHT and having the trade designation "TRIPLE CONCENTRATE", while stirring with a glass rod. This softener composition is obtainable from Lever Bros (Pty) Limited of 41a Frost Avenue, Auckland Park, Johannesburg, South Africa. 100 parts by mass of the resultant blend was diluted with 18 parts by mass water, while stirring, so that the solids content of the resultant composition or blend was about the same as that of SUNLIGHT "TRIPLE CONCENTRATE". All

mixing was done at room temperature. The resultant blend was poured into a suitable container which was then shaken vigorously.

The domestic fabric softener composition contains a domestic fabric softening agent capable of imparting, or modifying, softening properties such as softness, smooth hand, fabric conditioning, water absorption, non-scratchiness, fluffiness, and reduction in static, to or in a variety of different fabrics. It naturally also contains other components conventionally used in such compositions. The emulsion/dispersion was found to be compatible with the domestic softener composition. For example, the resultant composition was stable.

If desired, a lower proportion of emulsion/dispersion in the fabric treatment composition can be used. Generally, Applicant believes that good results will be obtained by incorporating between 1% and 50% by mass of emulsion/dispersion, based on total composition mass, in the fabric treatment composition. The Applicant has further found that incorporation of as little as 1% by mass emulsion/dispersion in the fabric treatment composition, resulted in a lowering of viscosity, which may be desirable as it enhances pourability, as compared to the domestic softener composition on its own. Applicant has further found that in compositions containing between 1% and 20% by mass emulsion/dispersion, the viscosity of the composition remains stable for a period of time.

Thus, the Applicant has found that whereas the domestic softener composition typically has a viscosity of 345 cP and a pH of 3,2, and the emulsion/dispersion a viscosity of about 50 cP and a pH of about 5, the fabric treatment composition, containing 20% by mass emulsion/dispersion, has a viscosity of about 35 cP and a pH of 4,0-4,2.

Instead of using SASOLWAKS A15, other grades thereof, such as SASOLWAKS A1, A28 or A2, which are also hard oxidized and/or saponified FT waxes, can be used.

10 Instead of using GENAMIN 0 - 050 surfactant, surfactants such as GENAMIN 0 - 020, obtainable from Hoechst South Africa (Pty) Limited or ETHOMEEN T-25, supplied by Akzo Chemie and obtainable locally from Chemimpo, PO Box 1378, Randburg, South Africa can be used to obtain suitable cationic emulsions/dispersions.

15 GENAMIN 0 - 020 has a HLB value of 4,9 and also contains oleylamine as active ingredient. ETHOMEEN has a HLB value of 19,3 and contains, as active ingredient, polyoxyethylene(15)tallowmine, ie an ethoxylated amine.

The proportion of acetic acid can be varied as desired depending on the surfactant. Thus, the emulsion/dispersion may contain up to 1,5% by mass acetic acid.

Instead of preparing the emulsion/dispersion at atmospheric pressure, it can be prepared under pressure, eg in an enclosed vessel at a pressure above atmospheric.

Also, instead of using a cationic emulsion/dispersion, a non-ionic emulsion/dispersion can be used with the domestic softener composition in question, in which case the surfactant used may typically be EMULAN OC and/or LUBROL W. The emulsion/dispersion may then typically comprise about 35 parts by mass wax; about 7 parts by mass surfactant; optionally, up to about 0,5 parts by mass 50% KOH solution (instead of acetic acid) for surfactant and pH control; and about 100 parts by mass water. The viscosity of this emulsion/dispersion is about 6 cP, and its pH about 4,4. The viscosity of a fabric treatment composition according to the invention and containing between 1% and 50% by mass emulsion/dispersion, was in the range of about 40 cP to about 70 cP, with its pH being 3,2. A lower pH is generally preferred for optimum exhaustion of the fabric treatment composition according to the invention from the rinsing liquor onto the fibres. The non-ionic emulsion/dispersion typically contains up to about 30% by mass solids.

Instead of using SUNLIGHT "TRIPLE CONCENTRATE", SUNLIGHT domestic softener composition obtainable under the trade name "MICRO" can be used, in which case 35 parts by mass water can be used instead of 18 parts by mass for solids adjustment.

The fabric treatment composition thus formed can be used as a softening composition during the rinsing of fabrics, domestic textiles, and industrial textiles of various grades or types, and of natural or synthetic fibres, after washing thereof, eg during the rinse cycle of an automatic washing machine. A layer of wax

and the domestic softening agent, is adsorbed, in the case of a cationic emulsion/dispersion (deposited in the case of an anionic or non-ionic emulsion/dispersion) onto the fabric or textile fibres. The softening agent imparts to the textiles or fabric good softening properties as hereinbefore described. The wax component in the layer thus deposited provides improved tear strength, good sewability, improved flex abrasion resistance and good colourfastness, leading to extended textile or fabric life.

During a subsequent wash cycle, the soap or detergent used saponifies or the like the deposited layer, and in particular the wax component thereof, so that the layer is removed from the fabric. In this fashion, build-up of layers of wax/fabric softening agent is minimized, and possible drawbacks associated therewith, such as yellowing/discolouration, minimized.

The Applicant has furthermore found that the blend thus formed is stable, ie the wax emulsion/dispersion does not readily separate out.

Initial tests conducted by Applicant show that a variety of fabrics or textiles treated with the composition of the invention, are colourfast during washing, contain little or no build-up on their fibres after washing and before re-application of the composition, and are not prone to sticking to an iron or to iron discolouration on ironing thereof. Furthermore, treated fabrics show good flex abrasion resistance and tear strength.

Other properties which may be improved are drape, seam slippage,

pilling, handle characteristics, and appearance retention. The enhanced flex abrasion resistance, and tear strength resulting from treating fabrics with the composition of the EXAMPLE are given in Tables 3 and 4, with the values being determined after the garments had been subjected to 50 washing, rinsing (which included dosing with the softener or fabric treatment composition), tumble drying (polycotton only), cool ironing (viscose) or hot ironing (polycotton) cycles, except for the control which was washed once only and not softened nor ironed:

TABLE 3

STOLL FLEX ABRASION RESISTANCE (CYCLES)

GARMENTS	WARP			WEFT		
	A	B	C	A	B	C
VISCOSE	254	1056	562	133	283	255
	367	870	770	107	296	169
	264	975	597	117	237	295
	379	872	772	154	195	280
AVG	316	943	675	128	253	250
POLYCOTTON	2785	3188	2093	2417	3039	1807
	2876	3395	2360	2636	2929	1867
	2659	3108	2295	2325	2888	1757
AVG	2773	3230	2249	2459	2952	1810

TABLE 4ELMENDORF TEAR STRENGTH (NEWTONS)

GARMENTS	WARP			WEFT		
	A	B	C	A	B	C
VISCOSE	51,2	58,2	59,2	40,3	60,8	45,4
	53,1	61,4	57,0	40,3	51,8	46,1
	53,8	61,1	58,3	35,8	55,6	47,0
AVG	53	60	58	39	56	46
POLYCOTTON	57,6	63,4	56,0	44,8	56,3	48,0
	55,7	63,0	51,8	47,4	58,2	40,3
AVG	57	63	54	46	57	44

LEGEND FOR TABLES 3 AND 4

- A = DOMESTIC SOFTENER COMPOSITION ALONE
 B = FABRIC TREATMENT COMPOSITION OF THE INVENTION, AS
 FORMULATED IN THE EXAMPLE
 C = CONTROL (UNTREATED GARMENT)

The fabrics treated with the composition also visably had less discolouration or yellowing than those treated with the softener only, after 50 washing and application cycles.

CLAIMS

1. A fabric treatment composition for domestic use, which comprises
at least one domestic fabric softening agent capable of
softening a plurality of different fabrics or textiles on
5 treatment of the fabrics or textiles with the composition; and
a removable wax in admixture with the domestic softening
agent.

2. A fabric treatment composition according to Claim 1
wherein the wax is oxidized and/or saponified, has an acid value
10 of 3 to 60, and has a saponification number of 15 to 120.

3. A fabric treatment composition according to Claim 2
wherein the wax is that derived from a Fischer-Tropsch process,
and has a relative density, at room temperature, between 0,9 and
1,0.

15 4. A fabric treatment composition according to Claim 2,
wherein the wax is a polyethylene wax.

5. A fabric treatment composition according to any one of
Claims 1 to 4 inclusive, wherein the wax forms part of an
emulsion/dispersion comprising also water and at least one
20 surfactant, admixed with the domestic fabric softening agent.

6. A fabric treatment composition according to Claim 5
wherein the emulsion/dispersion comprises, on a mass basis, from

5% to 50% wax; from 1% to 10% surfactant; and the balance being water.

7. A fabric treatment composition according to Claim 5 or Claim 6 wherein the emulsion/dispersion includes an acid or an alkali for surfactant and pH control.

8. A fabric treatment composition according to Claim 7 wherein the emulsion/dispersion comprises

wax	-	about 20 parts by mass
surfactant	-	about 5 parts by mass
acid/alkali	-	about 0,5 parts by mass
water	-	about 74 parts by mass

9. A fabric treatment composition according to any one of Claims 5 to 8 inclusive, wherein the domestic fabric softening agent comprises a quaternary ammonium compound and/or an amide imidazolinium alkyl sulphate.

10. A fabric treatment composition according to any one of Claims 5 to 9 inclusive, wherein the domestic fabric softening agent forms part of a domestic softener composition admixed with the emulsion/dispersion, the domestic softener composition also including at least one further component selected from the group comprising an optical brightener, a dye or colourant, a fragrance or perfume, a lower aliphatic alcohol, a thickening agent, a buffer, an anti-static agent, and a non-degradable long chain organic compound.

11. A fabric treatment composition according to Claim 10 which comprises, by mass, from 5% to 50% emulsion/dispersion; and from 95% to 50% domestic softener composition.

12. A fabric treatment composition according to Claim 11 which comprises, by mass

emulsion/dispersion - about 20 parts
domestic softener composition - about 80 parts

13. An emulsion/dispersion suitable for use in a fabric treatment composition, the emulsion/dispersion comprising a removable wax, a carrier liquid for the wax, and at least one surfactant.

14. An emulsion/dispersion according to claim 13 wherein the wax is oxidized and/or saponified, has an acid value of 3 to 60, and has a saponification number of 15 to 120, and wherein the carrier liquid is water.

15. A method of preparing an emulsion/dispersion suitable for use in a fabric treatment composition, which comprises melting a removable wax, mixing a surfactant with the molten wax; mixing an acid or alkali with the wax/surfactant blend; mixing the resultant wax blend with water which is at elevated temperature, and cooling the resultant emulsion/dispersion to room temperature .

16. A method according to Claim 15, wherein the temperature of the water is close to its boiling point, wherein the wax blend is added slowly to the water while stirring the water at about 400 rpm, increasing gradually to about 1000 rpm, and wherein the rate of cooling is controlled at between 1°C per minute and 20°C per minute, depending on the stirring speed, so that a stable emulsion/dispersion is obtained.

17. A method of making a fabric treatment composition, which comprises admixing

(i) a domestic softener composition comprising at least one domestic fabric softening agent capable of softening a plurality of different fabrics or textiles on treatment of the fabrics or textiles therewith, and a component selected from the group comprising an optical brightener, a dye or colourant, a fragrance or perfume, a lower aliphatic alcohol, a thickening agent, a buffer, an anti-static agent and a non-degradable long chain organic compound; and

(ii) an emulsion/dispersion comprising a removable wax, a carrier liquid for the wax, and at least one surfactant.

18. A method according to claim 17 which includes adding the emulsion/dispersion to the domestic softener composition with stirring, and diluting the mixture with a second carrier liquid which is compatible with the domestic fabric softener composition.

19. A method of treating fabrics, domestic textiles and/or industrial textiles, which comprises adding a fabric treatment composition according to any one of claims 1 to 12 inclusive, to a laundering cycle of such fabrics or textiles.

5 20. A method according to claim 19, wherein the fabric treatment composition is added to rinse water with which the fabrics or textiles are rinsed after washing thereof with soap or detergent.

10 21. A novel fabric treatment composition, substantially as described and illustrated herein.

22. A novel emulsion/dispersion, substantially as described and illustrated herein.

23. A novel method of preparing an emulsion/dispersion, substantially as described and illustrated herein.

15 24. A novel method of making a fabric treatment composition, substantially as described and illustrated herein.

25. A novel method of treating fabrics, domestic textiles and/or industrial textiles, substantially as described and illustrated herein.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9400388.6
Relevant Technical Fields	Search Examiner M ELLIOTT
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Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii)	Documents considered relevant following a search in respect of Claims :- 1-20

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A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X	EP 0079746 A2 (THE PROCTER & GAMBLE CO) whole document	1 at least
X	EP 0043622 A1 (THE PROCTER & GAMBLE CO) whole document	1 at least
X	GB 2115448 A (UNILEVER PLC) whole document	1 at least

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